APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,058	03/03/2006	Shinichi Uesaka	112857-529	1923

29175   7590   07/20/2007

BELL, BOYD & LLOYD, LLP
P. O. BOX 1135
CHICAGO, IL 60690

EXAMINER
DIAO, M BAYE

ART UNIT	PAPER NUMBER
2838	

MAIL DATE	DELIVERY MODE
07/20/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>03 March 2006</u>.

2a)☐ This action is **FINAL**.　　2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>16-30</u> is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>16-29</u> is/are rejected.

7)☒ Claim(s) <u>30</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>01/26/2006</u> is/are: a)☐ accepted or b)☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a)☐ All　b)☒ Some *　c)☐ None of:

　　　　1.☐ Certified copies of the priority documents have been received.

　　　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　　　3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>01/26/2006</u>.

4)☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____ .

DETAILED ACTION

Priority

1.   Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which

papers have been placed of record in the file.

Information Disclosure Statement

2.   The information disclosure statement (IDS) filed on 01/26/2006 has been

considered and placed of record. An initialed copy is attached herewith.

Oath/Declaration

3.   The oath or declaration is defective because the joint inventor did not sign.

Appropriate correction is required.

Specification

4.   The disclosure should be carefully reviewed to ensure that any and all

grammatical, idiomatic, and spelling or other minor errors are corrected.

Claim Objections

5.   Claim 30 is objected to because of the following informalities:

The limitation "The battery remaining capacity calculating program as claimed in claim

13, ..."does depend on a cancelled claim.

Appropriate correction is required.

Accordingly, claim 30 will not be further treated on the merits.

Claim Rejections - 35 USC § 102

6.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7.   Claims 16-19,21- 26 & 28-29 are rejected under 35 U.S.C. 102(b) as anticipated by Shimoyama et al., (Shimoyama) US PAT 5,872,453.

8.   As per claims 24,26, and 28-29, Shimoyama et al. disclose (abstract; col. 1, lines 5-67; col. 2, lines 1-28; col. 3, lines 54+;cols. 4-6; col. 7, lines 1-45) and show in Figs. 1-4:

a battery remaining capacity calculating device (19) for calculating a remaining capacity as a capacity of electricity dischargeable by a secondary battery (3), said battery remaining capacity calculating device (19) comprising:

voltage measuring means (12) for measuring an output voltage value of said secondary battery (3); and

arithmetic means (23) for performing information processing, a reference voltage curve (Y=aX + b) as a discharge characteristic of said secondary battery (3) being recorded in said arithmetic means (23)(see Fig. 3 and col. 4, lines 1-37);

wherein said arithmetic means (23) divides a use mode of said secondary battery into a high consumption mode in which the output voltage value (V_F) is not lower than a threshold value (V_N) and a low consumption mode in which the output voltage (V_F) value is lower than the threshold value (V_N),

said arithmetic means (23) calculates a remaining capacity of said secondary

battery (3) in said low consumption mode (which corresponds to maximum voltage V_F)

on a basis of the voltage value (V_N) (which is a point on the voltage-current

approximate linear function, col. 4, lines 34-36), measured by said voltage measuring

means(12) and said reference voltage curve (Y=aX + b), and

said arithmetic means (23) calculates a remaining capacity in said high

consumption mode (full charged voltage V_F) on a basis of a voltage gap (V_{FH} - V_F)(see

equations (2) and (3); col. 5, lines 11+) as an output voltage change (V_{FH} or V_{EH} or

V_{FL} or V_{EL}) at a time of a use mode change (from full charged to 0% remaining capacity

and vice versa) and said output voltage value by adding (respectively subtracting) a first

predetermined correct value (respectively a second predetermined correct value) to the

full charged voltage V_F (respectively from the empty voltage V_E).

Accordingly, claims 24,26, and 28 -29 are anticipated.

As per claim 16, Shimoyama discloses (col. 4, lines 18-25) that a program

configuration (thus meeting the limitation of claim 29) of a remaining capacity operation

portion (19) comprises a voltage estimate means (21), a remaining capacity calculation

means (23), a temperature discrimination means (27), a high temperature pattern

calculation means (29) and a low temperature pattern calculation means (31).

Furthermore since the method only recites the steps of measuring output voltage,

dividing a use of mode (which depends on the temperature, since the battery voltage is

proportional to its temperature, col. 3, lines 26-28), and calculating the remaining

capacity (via (23)) and since the device discloses the elements performing the step of dividing, measuring, calculating, the method would be inherent in view of the device.

9.　　Accordingly, claim 16 is anticipated.

As per claims 17 & 29, Shimoyama discloses (col. 1) that the battery remaining capacity calculating method, further comprising:

setting a reference remaining capacity (reference voltage V_N) as a remaining capacity (V_N) before the use mode change (from full charged V_F to 0% remaining capacity or vice versa) and a start voltage (V_N) as an output voltage ($V_N = V_E$, depending on high consumption mode) at a time of a start of the high consumption mode (when the battery is fully charged or $V_N = V_F$), wherein a remaining capacity is calculated on a basis of said reference remaining capacity (V_N), said start voltage (V_F), a predetermined cutoff voltage (V_E) of said secondary battery (3), and said output voltage value (terminal voltage of the battery (3) V_N).

Accordingly, claims 17 & 29 are anticipated.

As per claims 18 & 25, Shimoyama discloses (col. 4, lines 26+) that the battery remaining capacity calculating method, wherein the remaining capacity in said high consumption mode (0% remaining capacity) is calculated by an equation $\dfrac{V_N^2 - V_E^2}{V_F^2 - V_E^2}$

where $Q_n = \dfrac{V_N + V_E}{V_F + V_E}$ and $V_m = V_E$; $V_t = V_E$; $V_n = V_F$ using the reference remaining

capacity Q_n, the start voltage V_N , the cutoff voltage V_E, and the output voltage value

(terminal voltage of the battery (3), (V_N) .

Accordingly, claims 18 & 25 are anticipated.

As per claim 19, Shimoyama discloses () that the battery remaining capacity

calculating method, further comprising:

setting a voltage gap $(V_F^2 - V_E^2)$ as an output voltage change at the time of the use mode

change (from fully charged to 0% remaining capacity),

wherein a remaining capacity $\dfrac{V_N^2 - V_E^2}{V_F^2 - V_E^2}$ is calculated on a basis of said voltage gap and

said output voltage value (V_N).

Accordingly, claim 19 is anticipated.

10.   As per claims 21-22, Shimoyama discloses (col. 4, lines 1-59) and shows in Figs.

3-4 that the battery remaining capacity calculating method, wherein whether said

secondary battery (3) is in said low consumption mode (Full battery charged

corresponding to $V_N = V_F$) or in said high consumption mode (corresponding to 0%

remaining capacity or corresponding to minimum voltage, $V_N = V_E$) is determined by

measuring (via current sensor (7)) an output current value of secondary battery (3) or

by detecting (via voltage sensor (9)) a change in output voltage (V_N) of said secondary

battery (3).

Accordingly, claims 21-22 are anticipated.

11.

Claim Rejections - 35 USC § 103

12.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13.   This application currently names joint inventors. In considering patentability of

the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g)

prior art under 35 U.S.C. 103(a).

14.   Claims 20 & 27 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Shimoyama et al., (Shimoyama).

15.   As per claims 20 & 27, Shimoyama discloses (cols. 5 – 6; col. 7, lines 1 - 44) and

shows in Figs. 5 - 6 a correction method for accurately calculating the remaining

capacity of a battery by taking into account the temperature data (thus voltage variation,

since the voltage of a battery is proportional to its temperature, see col. 3, lines 26-28)

by adding or subtracting from the full-charged voltage or from the empty voltage

depending on whether the battery is fully charged corresponding to $V_N = V_F$ or in said

0% remaining capacity, which corresponds to minimum voltage, $V_N = V_E$.

Shimoyama differs from the claimed invention because he does not specifically

discloses the battery remaining capacity calculating method, wherein an addition

voltage value (V_m + ΔV) is calculated by adding said voltage gap ΔV (which

corresponds to either the first, second, third or fourth predetermined correct value, see

equations (2) to (7)) said output voltage value V_m, and a remaining capacity at said

addition voltage value (V_m + ΔV) on said reference voltage curve is set as the remaining

capacity Q_m in the high consumption mode .

Therefore it would have been obvious to one of ordinary skill in the art at the time

the invention was made to substitute the predetermined correct value which are

temperature correcting coefficients for a voltage gap since there is a tendency that a

battery voltage gets lower when its temperature gets lower, as per the teachings of

Shimoyama.

Accordingly, claims 20 & 27 would have been obvious.

Conclusion

16.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure. The prior art cited in PTO-892 and not mentioned above disclose

related apparatus and method.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to M'baye Diao whose telephone number is 571-272-9748.

The examiner can normally be reached on 8:30-5:00; First Friday off;.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Karl Easthom can be reached on 571-272-1989. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

M'baye Diao
Examiner
Art Unit 2838

M.D

KARL EASTHOM
SUPERVISORY PATENT EXAMINER